-Message From The President

Nearly \$104,000 Pledged So Far To Local Health-Charity Groups

Sandia Corporation employees have pledged almost \$97,000 to the Employees Contribution Plan, latest figures reveal. Other contributions not from employees brought the total raised during the campaign to nearly \$104,000.

In a statement mailed to all employees, the Sandia Corporation Employees Contribution Plan committee listed total employee contributions at \$96,915.58, with the average gift for each contributor being \$17.87.

Under the distribution plan worked out by the committee, \$81,- 569 has been pledged to the United Fund, and \$22,345 will be apportioned to the seven participating health agencies. An additional \$1,-816, or two per cent, will be held in reserve as an emergency fund for allocation to participating agencies. In addition to the Albuquerque United Fund the Plan includes the local chapters of the Cancer, Heart, Cerebral Palsy, Muscular Dystrophy, Multiple Sclerosis, Crippled Children and Arthritis and Rheumatism foundations.

The United Fund gift repre-

sents the combined contributions of the employees, plus the \$7,000 Sandia Corporation gift, \$365 from the Anderson-Dunham Co. (Coronado Club caterers), \$300 from the Coronado Club, and \$68.50 from employees of the Sandia Federal Credit Union.

The committee reported that 90.5 per cent of employees contacted have contributed. An additional 297 employees who were absent during the campaign are yet to be solicited, the committee stated.

To All Sandia Corporation Employees:

The outstanding results of the campaign to raise funds for the Sandia Corporation Employees Contribution Plan are a tribute to your generosity, compassion and good will.

The idea of contributing once for all agencies through payroll deduction as devised by your committee appears to be one that other industries may wish to consider.

Your response in pledging and contributing nearly \$97,000 to the drive is proof of good foresight and sound organization by the committee in planning the drive.

I praise most highly your fine record in this community effort and give you my personal thanks and appreciation for your accomplishment.

Womshare

SANDIA LAB NEUS

Vol. 9, No. 23

Albuquerque, New Mexico

November 15, 1957

Engineers Honor Donald A. Quarles

Donald A. Quarles, Deputy Secretary of Defense and former Corporation President, has received the 1957 American Institute of Consulting Engineers Award of Merit.

The award was presented by E. H. Anson. president of the Institute, Oct. 15 at the Hotel Waldorf-Astoria. The award cites Mr. Quarles as an "able administrator and noted scientist."

T. B. Sherwin Named To Board of Directors State PR Conference

Ted B. Sherwin, supervisor of the Public Relations Division (3125), was appointed to the Executive Board of the New Mexico Public Relations Conference at its quarterly meeting in Farmington recently.

Mr. Sherwin, who served as president of the organization last year, was succeeded by Bill Saffold, director of Public Relations of the Chino Mines Division of the Kennecott Copper Corporation at Hurley, New Mexico.



SEVEN MICRO-PRINT CARDS contain 190 pages of a typed large-size document yet the 3" x 5" cards are easily read with a viewer. "Bea" Allen, Technical Librarian, holds the cards. AEC and military documents are frequently received in this form.

TV's 'See It Now' Pictures Plumbbob

Operation Plumbbob and various phases of the atomic energy program will be featured on Ed Murrow's "See It Now" program Sunday, Nov. 24. The broadcast can be seen locally on KGGM-TV, channel 13, at 5 p. m.

Area II Snakebite Victim Gets Quick First Aid Job, Fast Trip to Doctor

When Edgar Pierce (2211-2) entered a storage shed in Area II one morning last week, he had no idea there was a cold, semi-hibernating rattlesnake waiting for him. As he reached for a piece of equipment the snake lunged sinking its fangs into the back of Edgar's hand.

Edgar called for help starting a frantic but efficient chain of events that brought him to the Medical Department and Dr. Henry Louderbough for treatment within 10 minutes.

On hearing the call, Frank Fox dashed into the shed, grabbed a broom handle and killed the snake. Bill Short reached for a first aid kit and started applying a tourniquet to the bitten arm. Meanwhile section supervisor C. C. Gully called the office of the Final Assembly Division 2211 and contacted Dennis Chavez to bring a vehicle to the shed—a distance of a mile—at once.

Chavez immediately called the Area II guard shack and told Security Inspector Benny Valencia of the emergency. Benny in turn informed the operations office of the guard unit to prepare the way through the Tech Area gates for the vehicle. He also called the Medical Department to expect a

R. N. Ball Speaks to Tech Writers Nov. 18 On 'Military Atom'

Addressing a meeting of the Albuquerque Chapter of the Society of Technical Writers Monday, Nov. 18, will be Russell H. Ball, coordinator of research application in the Office of Advance Planning, AEC-ALOO. His topic will be "The Military Atom."

Also appearing on the program will be Lee Parman (7223), president of the organization, who will report on the national STW convention which he will have attended in New York City.

The meeting will begin at 7:30 p.m. in the Southern Union Gas Co. Hospitality Room, 723 Silver SW. snakebite victim within minutes. Chavez drove to the storage shack arriving just as Gully and Short had finished applying the tourniquet. With Short accompaning the injured man and the way cleared, it was a fast two miles to Bldg. 831 and Dr. Louderbough who waited, prepared for the situation.

"The first aid administered to Pierce was an outstanding job," the doctor said, "the quick thinking shown by everyone concerned certainly prevented a serious situation from developing."

After treatment and a short rest Edgar Pierce returned to work. Next day he received a checkup on the wound from Dr. Louderbough and was reported safe from any infection.

USA New Weapons Needs to Be Discussed At Sandia Colloquium

"New Weapons Needs of the USA" will be discussed at a meeting of the Sandia Research Colloquium Wednesday, Nov. 20. Speaker will be Oskar Morgenstern, professor of economics, Princeton University.

The meeting will be held at 9:30 a.m. in the basement conference room of Bldg. 802. Tickets will be required for admission, Craig Hudson (5211) of the Colloquium committee reports.

E. R. Frye Speaks Before UNM Student Mechanical Engineers

"Plastics in Engineering" was discussed by E. R. Frye (1625-1) at a meeting of the student chapter of the American Society of Mechanical Engineers last week. The talk centered around the structural uses of plastics, especially in aircraft.

Mr. Frye is supervisor of Casting Resins and Adhesives Section in the Organic Materials Division 1625.

Scientists Go To Libraries To Lessen Laboratory Time

American industry has found that time spent in a library often reduces time spent in the laboratory and Sandia Corporation scientists follow along with the

It's a continuous job to select books of permanent value, track down volumes now out-of-print, and keep up with the change in

trend.

Bertha "Bea" Allen, who has supervised the Library Section since last May, notes that so far this year the circulation of both books and periodicals in the Corporation's library is 25 per cent higher than in 1956. Circulation of unclassified documents in the past year has increased 100 per cent due to more interest and better accessibility through cataloguing.

Bea came to Sandia after seven and one-half years at the Kirtland Air Force Base library. After starting as a reference and circulation librarian in 1952, she was placed in charge of the technical library and of research for technical intelligence. She holds a BS in Library Science from the University of Michigan and an AB degree from Carlton ton College.

"The work here is much the same as at Kirtland," she explains, in that it deals with different stages of research and development. Of course in addition the library here also supports the management functions of personemphasis in certain programs.

The library presently has approximately 27,000 books, many of which are on extended loan.

In the periodical line 720 different publications are received (many in duplicate copies) and 961 persons are on the monthly routing list for specific magazines and journals.

A year ago the library staff began the task of cataloging by subject unclassified documents estimated in number anywhere from 25,000 to 40,000. Current material is tackled first and clder papers are listed on a selective basis. To date about 6,600 documents have been indexed.

Bea notes that plans are now underway to move from Bldg. 880 to Bldg. 838 the engineering and specifications branch library in order to be closer to those organizations which have in the past used those facilities.

Sandia Corporation also maintains branch libraries at Salton Sea Test Base and at the Livermore Branch.



A. B. GOETZE, President of Western Electric Company, visited Sandia's Livermore Branch recently for a first-hand view of the new California installation. Chatting about the operation before a tour of the facility are, 1 to r, H. A. Pawell, Western Distribution Manager, Western Electric Co., San Francisco; R. E. Poole, Vice President at Livermore; Mr. Goetze; Harold A. Fidler, Manager of the AEC San Francisco Operations Office, and W. J. Howard, Director, Systems Development, Livermore.



Archer Gets Deer **On First Venture** Into State's Wilds

Leonard Nelson (2711) maintains he was "just plain lucky" when he shot a deer with an arrow in the area between Canjilon Lake and El Rito. Leonard has been practicing archery since last May. He used a razor back arrow head and a custom double recurve bow with a pull of 45 pounds.

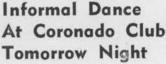
The deer was about 50 yards away when he shot the arrow the range of arrows with his bow is limited to 60 yards.

"Next year," he said, "I'm going to use a 76-pound bow to increase the range to 100 yards."

Mountain Club Elects

Election of new officers is scheduled for the New Mexico Mountain Club Monday, Nov. 18. The meeting will be held at Odlum Hall at Lovelace Clinic at 8 p.m.

Dick Martindell (1422) will lead the group in a climb of the Sandias on Sunday, Nov. 24. Weather permitting, they will tackle the peak known as the Thumb.



An informal dance tomorrow heads the list of events planned at the Coronado Club in the next

will beat out the rhythms from 9 to 1 tomorrow night. Admission is 50 cents for members, \$1 plus tax for guests.

A special "graduation dance" is planned for the night of Nov. 25 from 8 to 11 for the graduates of the Ballroom Dance Instruction class. All club members are invited to this function and admission is free.

Climaxing major activities this month is the annual Thanksgiving Buffet at the club Nov. 28. A sumptuous array of food will be on the buffet tables from 4 to 7. Leigh Sprague will play for dining and dancing from 6 to 10 p.m. Price for members is \$2.25 and \$3.35 plus tax for guests.

Social hours planned in the remaining weeks of the month are scheduled for Nov. 22, featuring the music of Orlie Wagner, and Nov. 29, with the music of J. Wilson and his group.





Strength For Your Life

What does Thanksgiving mean? Food and football? Many Americans think it means more than that.

They are the people who have taken on the task of strengthening in our people the role of religious faith in our daily lives. As a means of doing this they are encouraging regular church attendance during the month of November through the ninth annual Religion in American Life Program.

Every American is being urged to attend the house of worship of his choice in this nonsectarian emphasis on the importance of religion in personal, family, community and national life.

Programs in thousands of communities, churches and syna-gogues carry the campaign theme: "Find the Strength of Your Life . . . Worship Together This Week." The program comes at a time of increased interest in

church and synagogue attendance. Worship service attendance is up 12 per cent since 1950 and today 51 per cent of adult Americans worship regularly.

This year, and for the years to come, let Thanksgiving bring "food for thought" to your Thanksgiving table. We live in the abundance of the Twentieth Century. But has any of us so much, or so little, that he cannot find room or time in his heart for thanks? Let us not take our blessings for granted. Let us all give thanks unto God and resolve on that day to add new meaning to our lives by regular worship and church attendance.



GOOD EATING is represented by these pheasants which Cliff Boxx (7113) (left) and his hunting companion Herb Webster Woonsocket, South Dakota. (1651-2) shot recently near





TECH AREA WATERMELON grown on the west side of Bldg. 890-B is harvested by men of Reclamation and Inspection Section 2352-1. Looking forward to the serving of the 19 lb. watermelon are (L to R) Tircio Orega, Orlando Sanchez and Luther Martinez.

Sandianotes . . . **Overseas Vacation Takes Gibbes to** Europe, Africa by Land, Sea, Air

Give Help in Emergency

Emergency communications service was furnished three Albuquerque hospitals by the Caravan Club last week for six hours when a storm knocked out phone service.

James Lareau (1626), Dean Snyder (2131) and Carl Franz (1471) were among those who helped to relay messages for the hospitals on their mobile radio units.

Sputnik Finders

Want to catch a glimpse of Sputnik I or II? Joe Schatz, Bert Lindsay (both 5126) and Ralph Calvert (5121) have plotted the orbits and can tell others where to look and when.

Anniversary Month

Wedding anniversaries will be marked this month by five employees in 2711.

Mr. and Mrs. William M. Phillips marked their 31st anniversary on Nov. 5 with a dinner at La Hacienda; Mr. and Mrs. John M. Gustafson celebrated their 21st anniversary on Nov. 7; Floyd and Edith Irwin (both 2711) had their 21st anniversary on Nov. 14, and Mr. and Mrs. Floyd L. Martin noted their ninth observance on Nov. 6.

ding anniversary on Nov. 25 will be Bob (5131) and Leigh (5125-1)

(7113) welcomed little Cecilia Glen into their home on Oct. 28. The Brays already have another youngster.

Returning recently from an extended tour of Europe and Morocco was Carter W. Gibbes (7424). Mr. and Mrs. Gibbes flew Royal Dutch Airlines from New York to Shannon, Ireland, via Gander, Newfoundland. Leaving Gander after dark the couple witnessed a magnificent display of the Northern Lights illuminating huge floating icebergs in the dark sea

below. From Shannon the couple traveled by train to Dublin and then flew to Edinburgh, Scotland, to attend the music festival. While there they met Mr. and Mrs. Al Gruer (5210) who were celebrating their 25th wedding anniversary in Europe.

The Gibbes flew to London, toured England and crossed the channel to Paris and Marseilles. Engaging a motor car they toured southern France, crossed the Pyrenees mountains and motored through Spain.

From Spain the couple crossed the Mediterranean by boat to Tangier, then motored through Morocco. They returned to Madrid, flew to Lisbon, Portugal, and then New York.

Also observing their 21st wed-Hendricks.

New Daughters

Mr. and Mrs. William M. Bray



two weeks.

Leigh Sprague and his orchestra

VICIOUS BUT EXCITING Paul Spencer (7411) (right) shot this 212 lb. bear from the mouth of a cave in the Cuba area on Nov. 2. The tough part occurred when he and Tex Samuelson (2351) crawled in after the bruin.

Livermore Ladies Meet

Livermore Branch women held their second annual get-together on Nov. 7.

The 34 women employed by Sandia at Livermore had dinner together at Castlewood Country Club, formerly the William Randolph Hearst "ranch," and then exchanged "white elephant" gifts.

The country club was also the location for a Halloween dance, sponsored by the University of California Rad Lab Recreation Association, which was attended by some 50 Sandia couples.

year-old daughter of Herbert I. Jewett (2121-1), shown here with a 65 lb. doe antelope she killed with a Savage 243 at Milnesand, N. M., this fall. It was, Sandra's first antelope hunt.

Twin Excitement

The big excitement around the Stephen Neff household (he's in 2533-2) is twin daughters, born Nov. 7. The Neffs already have six children. Julie Jeanette tipped the scales at six pounds and Teresa Josephine weighed seven pounds, four ounces at birth.

Voice Recital

Elaine Hughes (3154), a contralto, will be in a voice recital Nov. 22 at the Albuquerque High School auditorium at 8:15 p.m. Her concert will be sponsored by the Albuquerque Civic Symphony Association.

wife have another daughter, Diana Elizabeth, born August 17.

Welcome Back

Co-workers in 7411 welcome back Al Elsea, who has returned after a lengthy illness.

2100 Christmas Party

Organization 2100 will hold its annual Christmas party on Nov. 30 at the Coronado Club. The evening's entertainment will feature 2100 talent, music by Ray Giles and his band, and light snacks.

Alaskan Trip Pictures

Leroy Hassebroek (7311) will give a slide lecture on his recent trip on the Alcan Highway during the Nov. 21 meeting of the Enchanted Lens Camera Club.

The show starts at 7:45 in the Indian building at the State Fair Grounds. The public is invited.

Fatal Accident

Sympathy is extended to Estra Hill (8212-4) for the death of her husband, Jimmy, in an auto accident in South Dakota on Oct. 31. Carol Cowan and Martin Vigil (7411) -News across a drafting table-

Speaking of Reporters

This is another article telling of the volunteer reporters who contribute to the Sandia Lab News.

Drafting tables form a familiar environment for Carol Cowan (7226) who has been assigned to drafting organizations during her three and one-half years at Sandia. Carol has been a Sandia Lab News reporter nearly that long.

An Albuquerque resident for five years, Carol is originally from Moose Lake, Minn. She adds, "I miss the water but I surely don't miss the severe winters."

For a hobby she and her husband raise Chihuahuas: "My husband started it all, but after he got the dogs I acquired the interest." They now have five adult dogs, the smallest weighing only two and one-half pounds. Since it's such a problem to keep from stepping on the little animals they keep four in a heated garage and only have to worry about one in the house. They hope to develop a good show type.

Sandianotes . . .

George Martin Tries Orange Venture Once Again After Freeze-Out in '51

The "big freeze" of 1951 in the lower Rio Grande Valley of Texas brought about many changes. The tops of the orange trees froze although the roots remained alive so when the trees bore fruit the oranges were the sour stock variety.

When local food processing plants found it necessary to cancel orders for machinery and chemicals, an employee of one of the latter firms decided it was a good time to move to greener fields.

So George Martin (7411) accomplished the transition from 'Texas' citrus belt to Sandia's drafting tables.

He has remained at Sandia for six years but still retains an interest in growing.

In 1949 George had purchased seven acres of land near MacAllen, Tex. He leases the land out with cotton grown in the summer and short crops (such as tomatoes or lettuce) during the remainder of the season.

Last December George decided to once again try his luck with oranges and purchased 614 yearold orange trees. The citrus cooperative in MacAllen will pick the blossoms from the trees, eliminate weeds and in other ways care for the young trees until they are large enough to bear marketable oranges-in 2 or 3 years.

Japan Bound

Personnel in Division 5521 recently held a farewell luncheon for Mickey Heiberger (7225 on loan to 5521) who will leave this month to live in Japan, where she will work in a Civil Service position.

Weddings and Engagements

The engagement of Shelby J. Jester (4135-2) to G. Stanley Kimball (2542-2) has been announced with the wedding set for Feb. 8 at Christ Methodist Church. Shelby graduated from high school in Camden, Ark., and has



Shelby Jester

been with the Corporation since June 1956. Stan received his Electrical Engineering degree at the University of Oklahoma and has been employed at Sandia since June 1956.

Best wishes are extended to Bonnie Knight (7225-6 assigned to 5144) on her recent marriage to Owens C. Hood.

Bonnie has been at Sandia since ast April

Grid Hazards

Despite a violent rainstorm which later turned into hail, 5100's potent multiple offense recently defeated a strong 1600 team 19-6. Jim Tichenor scored three touchdowns on passes from halfbacks Sam Hong and T. S. Trybul.

Mild confusion reigned in the last quarter when T. S. Trybul intercepted a pass and lost his trousers as an opposing tackler tore his belt loose reaching for the flag

Freak Deer Bagged

A "freak" deer that had been hunted by local ranchers for some time was downed by H. A. Howell (7311-3) during a recent trip to Chico, N. M.

The buck had been wounded in previous years and only had three legs, one horn was similar to that of a caribou and the other horn had 13 or 14 small points.

Other successful nimrods were Dale Young, who shot a doe, and Hal Ragsdale, who brought down an 11 point buck, in the area between the San Juan and Pine Rivers. Hal presented Dave Karthauser with the antlers from his buck after Dave tracked down the wounded animal and gave him a chance to kill it. All three men are in 5126.

Get Well Wishes

Organization 2111 extends "get well" wishes to Willa Urbanoski, who has been ill since Oct. 14. Division 2551 hopes for a speedy

recovery for Marilyn Howard (2551-1), who has been ill for the past month. Wishes for a quick recovery are also extended to L. A. Faw (2552).

Safety Director Speaks

A. Burton Metzger (3210), Corporation Safety Director, addressed a group of instructors of the Special Weapons Training Group, Field Command, Nov. 7.

Mr. Metzger's talk covered hazards encountered with electricity, electronics, and microwaves; the effects of electric shock and microwave radiation on the human body; and precautions to take in order to prevent injury.

Anniversary Surprise

Friends of Wayne A. Grimshaw (8114-1) and his wife surprised them with a party in observance of their 25th wedding anniversary. Mr. and Mrs. C. S. Wolowicz (8114), Mr. and Mrs. C. P. Rindone (8114-2) and Mr. and Mrs. Ben Fisher (8122-1) showed up at the Grimshaw home with cake and good wishes.

Wayne has been with the Corporation five years both in Albuquerque and Livermore.

Care in Parking, Urged by MP's

Motorists using the parking area opposite the Administration Bldg.

SANDIA LAB NEWS

Stroke a Cat's Back **Static Electricity Often Is Killer** When Explosives Are Around

Sparks leap from a car key to the lock. A jolt occurs after a walk across a carpet and a metal doorknob is touched. A cat's fur crackles as you stroke its back.

This is static electricity generated by friction and it is normally harmless. At Sandia Corporation it became a threat.

A number of types of explosive one-shot actuator devices - some about the size of a filter on a cigaret - now undergoing investigation at Sandia Corporation, require extreme care in handling. An electrostatic charge generated in the human body by friction could fire these actuators. Resulting explosion would be comparable to a small calibre rifle cartridge.

Static Free Areas

To insure absolutely safe handling of these actuators and other explosive devices, the first of several required static-free areas has recently been completed in Rm. 128 of Bldg. 892. The problem was not so much prevention of static generation but the prevention of accumulation of static. In other words, static energy should drain off harmlessly as it is generated and not be allowed to build up to a point where a spark would be discharged.

Determining the exact amount of electrostatic energy that would fire the actuators became the job of F. A. Goss and the Power and Switching Components Development Division 1463. Mr. Goss and H. R. Johnston (also 1463) perfected a device capable of simulating the conditions of static discharge in the human body for testing the static susceptibility of the actuators.

Ed Godin (1463) ran a series of exhaustive tests to gather data.



HOLDING one of the small explosive actuator devices that underwent susceptibility tests is Ed Godin (1463). The tests were a prelude to building the present anti-static safety areas.



EXAMINING ONE of the special soldering irons that can be used inside the anti-static areas are Dick Stolzenberg (2541) and Parker Wallace (3211), who shared design responsibilities in the development of anti-static areas. Note warning signs at entrance.



This information became part of the specifications for building the static-free areas.

All surfaces in the static-free area are good conductors of electricity-walls, floors, tables, chairs, workbenches, etc. These special conductive surfaces make easy the flow to ground. Every precaution is taken to insure against static accumulation.

Cotton clothing will be worn in the static-free areas as well as conductive cotton foot covering. Each operator who uses the room will wear a wrist strap connected to a ground. Specially designed soldering irons will be the only electrical equipment allowed in the areas.

The entire area is monitored by a sensing device called a staticator which will sound an alarm if an improperly clothed individual enters the area or if unauthorized static producing materials are brought in. An aerial system for the staticator criss-crosses the room.

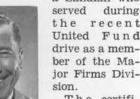
Designers of Area

Sverre Johannesen (2541-3), Dick Stolzenberg (2541-3) and Parker Wallace (3211-1) were responsible for the design of the areas, the many problems concerning the safety of personnel, testing and procurement of materials and obtaining and installing a suitable monitoring device.

The first static-free area in Bldg. 892 went into operation last week and two more areas in Bldg. 894 and 834 will be completed soon. Plant Engineering, Maintenance and Purchasing Departments cooperated fully with Safety and Manufacturing Engineering Components Departments in readying the areas in record time.

Citation Awarded Harold Gunn for Service to Drive

The Albuquerque Community Chest and United Fund honored a a Sandian who



the recent United Fund drive as a member of the Major Firms Divi-

The certificate given to Harold F. Gunn (3153) stated: "The Board of

Directors of the Albuquerque Community Chest in acknowledgment of fine service rendered by Harold F. Gunn tender this citation of its high esteem and appreciation of his unusual and outstanding performance in the 1957 United Fund campaign."

H. F. Gunn

The citation was signed by E. ale Nettletor

Congratulations

Born to:

Mr. and Mrs. C. K. Connolly (1611-3) a son, Robert Charles, on Oct. 23.

Mr. and Mrs. Kenneth E. Helmstadter (1624-4) a son, Jon Eric, on Nov. 1.

Mr. and Mrs. Joe Sanchez (7329) a daughter, Laura Marie, on Nov. 2

Mr. and Mrs. John Wood (1614) a daughter, Mary Linda, on Oct. 31.

and Mrs. Louis Roybal Mr. (2711) a daughter on Oct. 31.

Mr. and Mrs. Delfin O. Salazar (2711) a son, Jude Edward, on Oct. 30.

Mr. and Mrs. Frank Sanchez (2711) a son on Nov. 1.

Mr. and Mrs. Harold Vaughn (5144) a son, Mark Roy, on Oct. 27.

Mr. and Mrs. B. N. Charles (5121) a son, Andrew, on Nov. 6. Mr. and Mrs. Duard Woffinden (1456) a son, Thomas Joseph, on Oct. 27.

on the west side of Main Street are urged by the Base Provost Marshal to be considerate of others in their manner of parking.

The MPs have been issuing warning tickets to vehicles which block or otherwise interfere wtih the passage of other cars. Motorists are also asked to use caution in driving out of this parking area.

Second Half of British Movie on Noon Schedule

Sandia Corporation's movie schedule for the next two weeks includes the last half of a featurelength British film and two short offerings.

Part 2 of "The Lavender Hill Mob," starring Alec Guinness, will be shown Nov. 19-22.

"Adobe Village" and "Cross Section of Central America" will be the features on Nov. 26-29.

The free movies start at 12:10 p.m. in Room 3, Bldg. 849 on Tuesdays and Thursdays and Room B-6 of Bldg. 802 on Wednesdays and Fridays.

PROTECTIVE COTTON clothing and foot coverings must be worn by operators who work inside the anti-static areas. Another rule is touching the grounded doorknob before entering the area. Front to back: Wilma Archbold, Ruth Gustin, Verna Clark, Eulita North and Ernest Lovato. All are wiremen in the Cable Section, Dept. 2230.

Community Chest Board of Directors, and C. Robert Hubbard, chairman of the United Fund committee.

R. W. Kulterman To Present Paper In Washington, D. C.

A technical paper written by three Sandia Corporation scientists will be presented by one of the authors at a conference in Washington, D. C., next week. R. W. Kulterman will make the presentation. F. W. Neilson and W. B. Benedick are the other two authors.

The paper will be presented at a conference on Magnetism and Magnetic Materials and will be published in the Journal of Applied Physics. The paper, "Pulse Generator Based on High Shock Demagnetization of Ferromagnetic Material," is the result of studies performed by the men while working in Applied Research Division 5132.

Sandia Housekeeping Job Big As Taking Care of 1000 Homes



NIGHT SHIFT janitors, scheduled to begin work at 4:30, begin arriving at Rm. 144 of Bldg. 887 about 3 in the afternoon to join in an hour of relaxed conversation before beginning their duties.

Fred Leckman Studies Auroras In IGY Research

One of the mysteries remaining to science is the nature of auroras -what exactly causes them and what controls their behavior? Here in the Southwest we are a long way from the Aurora Borealis or "Northern Lights," but auroras are observed as far south as Albuquerque.

An official volunteer observer of auroras for the International Geophysical Year is Fred Leckman (7424) who has been interested in auroras since 1942 when he was a celestial navigation instructor with the Goodrich School of Aeronautics in Los Angeles.

"A full scale auroral effect is breathtaking to behold," Fred says, "the whole sky lights up in pastel-colored tones--rays undulate and swirl in splendid patterns."

In the southern polar region auroras occur and are called Aurora Australis. Records show that larger northern and southern auroras displays have occurred at the same time but there has never been worldwide simultaneous observation. This is one of the purposes of IGY.

Observation has shown that sunspot activity and auroras are closely connected. At times of great geomagnetic storms, auroras usual 20 de-



Andy Kuntz (2474) -janitor with a flair-

ing cards are furnished by IGY. Eventually, the information furnished by observers all over the globe will help scientists learn the total energies received from the sun. "The information will be important in communications, upper atmosphere studies, understanding cosmic rays and, finally, man's journey into space." Fred predicts.

Typical of Sandia Corporation's janitors, Andy Kuntz, a thin wiry man with flecks of gray over his temples, tackles his job with enthusiasm and a flair. An ex-placer miner, guard and dude ranch cowboy, Andy has lived with the lifelong adage of "if a thing is worth doing, it's worth doing well."

This creed applies to the Corporation's 87 janitors who clean and maintain more than 1,250,000 sq. ft. of floor space-equivalent to 1.000 average-size American homes.

Using mechanized methods and powerful cleaning fluids, all office areas are swept, thoroughly cleaned and mopped with a disinfectant about 12 times more powerful than carbolic acid.

"Not only is the plant clean," Andy says, 'it's sanitary. No germs can live on the floor surfaces."

Plentiful Supplies

Monthly cleaning supplies amount to 150 gallons of disinfectant and cleaning solution, 210 gallons of wax, 285 cans of scouring powder and two tons of sweep_ ing compound for use in the plant area.

Hundreds of thousands of square feet of floor space is cleaned nightly and regularly waxed and polished. Waxes used have a high degree of non-slip quality for added safety. More than 200 rest rooms are thoroughly cleaned and sanitized nightly by the janitors and many are cleaned during daytime hours.

Housekeeping duties of the janitors extend to wall washing, window cleaning and trash removal. Sanitation is an objective as well as fire prevention. Good housekeeping is important toward having a smoothly functioning plant.

Scrubbing machines, vacuum cleaners and buffing machines take drudgery out of cleaning operations. Emphasis is on efficiency and speed. Morale of the janitor teams is at a high level. Not scheduled to begin work until 4:30 p.m., the men start arriving for work around 3. Room 144 in Bldg. 887, equipped with a long table, chairs and benches, serves as headquarters for the janitors.

Here, too, is the laundry facility which is Andy's pride and joy. As part of his duties Andy operates the laundry where each week all of the mops used in the Corporation are cleaned and treated to pick up dust.

'Savings realized in the four years the laundry has been in use has more than twice paid for the equipment." Andy says. "By cleaning the mops regularly they last considerably longer."

In addition to the mops, the laundry is used to wash protective clothing issued by the Corporation and linens and blankets from the women's lounges.

Heading the night crews of jani-



"vision and ability"

JC's Honor Matt Ungerman's Leadership, Vision, Ability

A dancing club which in 38 years has grown to a worldwide civic organization with more than 525,000 members has honored a Sandian for his foresight and service

A highlight of the Junior Chamber of Commerce Far West Institute, held in Albuquerque this month, was presentation of a plaque to Matthew Ungerman (2223). The award was "in honor and with deep appreciation of the distinguished and unselfish service

Lee Parman Presents **Paper to Tech Writers New York Conference**

Lee Parman (7223), president of the Albuquerque Chapter of

> the Society of Technical Writers, and Gurdon Miller (5111) are in New York this week attending a convention of the national organization. Mr. Parman

will deliver a paper, "A Short

Course in Technical Writing" written in collaboration with Bill Carstens (7223). The paper describes a course that is five weeks long, two classes a week of $1\frac{1}{2}$ hours duration offered at Sandia for technical employees desiring such training.

Lee Parman

given to the Junior Chamber of Commerce movement while serving with outstanding leadership, vision and ability."

November 15, 1957

Back in St. Louis in 1912 there was a federation of dancing clubs. Its members were young men from 20 to 25 years old just entering the business world.

When members of the Herculaneum club, to which "Matt" belonged, got a bit tired of dancing they turned to civic affairs and organized the Young Mens Progressive Civic Association in 1915. Matt was one of the 10 elected board members and was chairman of publicity. The organization grew and grew and four years later became known as the Junior Chambor of Commerce.

In 1920 Henry Giessenbier, former Herculaneum club prexy, call_ ed a caucus of all young men's organizations throughout the country. The U. S. Junior Chamber of Commerce was formed and he was elected the first president.

There are now 3,400 chapters in the United States and Jaycees in 21 foreign countries.

Anyone for Boating?

Anyone interested in organizing and participating in a local boat club is urged to contact D. W. Sherwood (AEC) at 81-279. "This is an attempt to survey the extent of interest and is not restricted to those presently owning boats." Mr. Sherwood says. "We will plan a meeting soon to discuss forming an organization."



any way you look at it...

extend far beyond the grees of the earth's magnetic poles

"IGY observers are alerted by the National Bureau of Standards when sunspots and magnetic disturbances in communications indicate there might be an auroral display," Fred says. Solar data is channeled to the Bureau from a chain of world-wide observatories.

"When it looks as though conditions are right for anroral displays, the IGY group calls a Special World Interval and the word is transmitted throughout the world to observers," Fred says.

Since he volunteered for the program last winter, Fred has been in several alerts.

"During one of the alert periods," Fred says, "the sky was overcast with clouds but on another occasion I was able to observe an 'air glow' in the north. This is part of the auroral effect."

Observations are made with an instrument called an inclinometer which measures the altitudes of auroral features above the horizon. Both the inclinometer and report-

"At the moment," Fred says, "we could use some more observers. It's a fascinating activity."

Anyone interested can contact Fred on ext. 22165 for further details.



Fred Leckman (7424) -IGY observer of auroras-

tors are Dave Reid, Joe Catallo and Hadley Rowe. Lloyd Wilson is supervisor of Janitorial Service Division 2474.

Andy Works Days

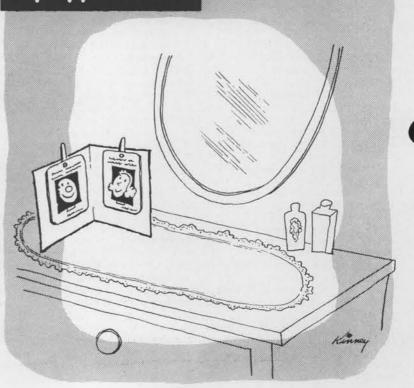
Andy is one of the few janitors who works days. He cleans hallways in Bldg. 887 and 866 in the afternoons and is on standby call for emergencies during the day.

Andy has spent seven years at the Corporation. His hobby is woodworking with a power lathe that he built. Prior to coming to work at Sandia in 1950, he was a placer miner near Golden, N. Mex.

"Never struck it rich." Andy says, "but it was exciting. Once I took \$350 out of my claim in a couple of weeks."

Before trying the mining business, Andy worked as a guard at El Vado dam near Chama, N. Mex., during World War II. In the years preceding the war he worked as a cowboy on a dude ranch near Pena Blanca.

"I like Sandia Corporation," Andy says, "and I fully intend to work here until I reach retirement age-a long time to go, nine years.'



They love to fly and Wild Blue Still Beckons These Sandia Pilots

A glance at the blue, yellow or green private planes parked at Albuquerque's West Mesa airports will vouch for the growing popularity of pleasure flying among Sandia employees.

Among members of the Corporation's 7100 organizations conversation about flying is likely to edge out the subjects of hi-fi, sports cars or conservancy taxes. Many of the men in the organization hold private licenses or are former military pilots.

Probably the man devoting the most time to private flying is Charles D. Herndon (7132) whose lifelong desire to fly was only partially realized in World War II when he was a B-24 mechanic, crew chief and flight test engineer.

After the war he was a charter member of the "Air Knockers." University of Oklahoma sponsored flying club where he obtained his private pilot's license. In 1949 Charlie traded a worn out English motorcycle for a pile of plane parts at the university hanger. A month later the do-it-yourself kit had developed into a fully licensed Vultee BT-13A.

With the help of war surplus parts Charlie flew this craft for two years. This hobby has resulted in nine or 10 rebuilding operations on different craft in the past eight years. He's also logged up over 2,000 hours and earned a Commercial Flight Instructor rating and an Aircraft Engine Mechanic rating.

His latest project has been converting a barely flyable 85 h.p. Swift and a partially damaged 125 h.p. Swift into a two-place, low wing, all metal 125 h.p. Swift GC-1B.

The Herndons have five daughters and four sons and they have all been in the air, even the sevenmonth-old baby. Charlie says, "The only trouble is I have to fly the family in shifts. Guess I'd better look for a surplus DC-3 next."

* 0 0

Most enthusiastic about flying is Sandia's Director of Military Liaison Services Arthur B. Machen, who has a brand new Piper Tri-Pacer. The pink and white color and fancy upholstery looks as if Mrs. Machen had her hand in the choice, but "Art" explains that she really wanted blue.

The full instrument panel on this sleek 150 h.p. plane is considerably different from the Lincoln bi-plane that Art first flew in El Paso in the 1930's. "I was only 17 years old," he said, "and had to be careful that my parents didn't hear about my new interest."

"Barnstorming" days in the Texas Panhandle are recalled fondly by "Tex" Irvin (7111-1). He began flying in 1928 and continued this pleasant sport for 10



Arthur B. Machen and his Piper Tri-Pacer -first flying was a secret; fabric covered bi-plane was considerably different-

years. "Landing in wheat fields to pick up passengers was considerably different from landing operations at airports nowadays-and I think it was more fun," he explains.

During the war Tex worked for Lockheed Aircraft in Ireland, Scotland and England and since has held an Aircraft Engine Mechanic license.

E. W. "Kernie" Kersten (7113) maintains he feels like "a bird without wings" since he sold his Luscombe all metal four-place plane. The 185 h.p. craft brought him to Albuquerque five years ago to work for Sandia after many pleasure trips with his wife in the East and Middle West.

Kernie recalled, "I'd always wanted to learn to fly but with putting three kids through college on a high school principal's salary it wasn't possible. Then in 1951 when I changed to selling life insurance I traded a policy for instruction."

Mrs. Kersten used to enjoy flying with her husband until one trip back to New York when she remarked somewhere over Pennsylvania "I don't know where we are" and Kernie promptly added (in fun) "neither do I."

Don R. Knapp (7130) has done some private flying and holds an instructor's rating, however the main portion of his flight hours were chalked up during 12 years in the Navy. He spent two years



E. W. Kersten

flying P-40s in the Far East with Chennault's Flying Tigers.

* 0 *

M. V. Gowdey (7123-2) who has

held a private license since 1951.

He took his first training in Bre-

merton, Wash., and since has

flown in the Civil Air Patrol and

week-ends as a member of a flying

flying with the best of them but

right now he's content to be on

the ground. "Grish" was in the Air

Force from 1942 to 1950 first in

weather reconnaissance where he

flew both the North and South

Atlantic checking conditions for

clearing bomber aircraft bound for

In 1945 he became one of the Air Force's first "hurricane hunters." Grish flew into about a dozen

W. G. Grisham (7111) can talk

club

Europe.

Another avid pleasure pilot is

John Colp Speaks **On Sandia Reactor**

John L. Colp, Radiation Effects Section supervisor 1626-1, will address a meeting of the Professional Group on Nuclear Science of the Institute of Radio Engineers Monday, Nov. 18.

"The Sandia Engineering Reactor Facility" will be the title of his talk. The meeting will begin at 7:30 p.m. in the student lounge of the Engineering Building, University of New Mexico.

Division 5126 Using New Rapid Graph **Plotting Machine**

A machine that can plot a page size graph in 30 seconds is now in operation at Computer and Numerical Analysis Division 5126.

The digital plotter is specially built by the manufacturer to meet specifications and to date no two have been identical. Chief advantage of Sandia Corporation's plotter other than speed and elimination of manual processes is its ab.lity to chart graphs directly from information contained on punched tape from a computer. It can also be adapted to use IBM cards in its operation.

Other features of the plotter are that it uses 12-inch wide fan-fold paper for continuous high speed plotting, as many as eight curves can be plotted simultaneously, the mechanism moves forward or backward and information may be fed manually on a keyboard.

Emily Young, Hugh Colvin and William Whisler will be the principal operators of the new machine.

ASME Members Meet Wednesday

Meeting Wednesday, Nov. 20, the N.w Mexico Section of the American Society of Mechanical Engineers will hear a talk entitled Precision Metal Fabrication." Speaker will be George B. Marzolf, Sr., general manager of Farwell Metal Fabricating Co., St. Paul, Minn.

The meeting will be held in Rm. 101. Mitchell Hall, University of New Mexico starting at 7:30 p.m., according to E. H. Copeland (1471), publicity chairman.

Welcome Newcomers Oct. 28-Nov. 8

Albuquerque	
Robert J. Horiert	2151
	2333
	2333
Mary to McClellan	2713
Mary L. Milligan	3153
Roy N. Montell	2131
Rose L. Saul	4135
Samuel D. Stearns	1421
California	
Nancy A. Imlig, Pleasanton	212-3
Susan E. King Livermore	212-4
	14-2
	11-3
John J. Sheridan, etchadte	
Colorado	4113
	1218
Sam L. Jerrers, colorado opringe	1210
Kansas	4122
William L. Dye, Jr., Parsons	0121
	2131
Illinois	7410
Roy W. Ewing, Springfield	1412
Indiana	
Ronald L. Helm, Indianapolis	4135
Michigan	1110
Edward J. Vavro, Detroit	1012
New York	
David R. White, Valley Stream	2154
Oklahoma	
Ernest R. Sanders, Bessie	2131
James C. Gruver, Dallas	14-1
William D. Zinke, Seattle	1282
Edward J. Vavro, Detroit New York David R. White, Valley Stream Oklahoma Ernest R. Sanders, Bessie Gregon James C. Gruver, Dallas	2154 2131 14-1

Service Awards **Ten Year Pins**



-Luscombe 4-place-



Charles D. Herndon -Swift GC-IB-

hurricanes himself and was flight commander for many other operations during his two years at Morrison Field in Florida.

Others who have formerly been fliers, but are not airborne now include: R. D. Brooks (7131) who received his training during World War II and has accumulated enough hours for a commercial pilot's license; and John Sundberg (7113) who was a Navy pilot in WW II and only this year dropped out of the Naval Air Reserve after 11 years.

In Division 7132 John R. Tolmie has held a private license since 1947; William M. Sodja completed 35 missions while a B-24 pilot with the Eighth Air Force; Albert A. Schnedler is a commercial flight instructor and chalked up 101 missions while a P-47 pilot for the Ninth Air Force during World War II: and Arthur L. Savage flew 55 missions as a B-26 navigator in Korea then flew for three years with the Military Air Transport Service.



Lee W. Schulz 2532 Nov. 20, 1947 Claudine H. Sproul 2461-2 Nov. 24, 1947

Five Year Awards

le B. Anderson 5131, John J. Simpson Dorothy Harrington 7221, Cloy B. Knock 7421, 2553.

Richard M. Sanchez 2351, Neith J. Pollard 1413, Myrtle E. Davis 2231, and Carl L. Walton 2154.

Nov. 22-29

Russell L. Maxwell 1471, Loran G. Anderson 2532, Joseph R. Garcia 3152, Elmer G. Goep-fert 2111, Kenneth R. Edwards 7232. Hildegarde E. Fink 2461, Merle W. Alexander 2124, Edith A. Worley 2462, Jacob E. Aragon 2461, and Seyfred R. Toledo 2232.

Gertrude M. Byrne 7225-3 Nov. 25, 1947

Eugene O. Rudat 2152 Nov. 28, 1947

Two Year Certificates Nov. 15-21 Robert A. Randall 1472, Louis W. Jamme 7412, Richard P. Demmel 4152, Charlsie F. Brunson 2333, Peggy P. Shoemaker 7225, Lau-rence F. Estabrook 1472, and Mary L. Hume 2522.

2522. Nov. 22-29 Werner W. Kuhn 1624, Richard A. Dickson 3125, Irving C. Elliott 7411, Arnold Jones 6000, Leora E. Riggan 2333, Ruth M. Chapman 2461. Lucille A. Jagger 4121, Margaret A. Sanders 7225, Leonard F. Foster 7411, Richard H. Olive 2124, Eustaquio Rael 2153, and Sondra L. Stelter 2461.

November 15, 1957

Supervisory Appointments

J. GORDON HAWLEY to supervisor of Electromechanical Sec-

tion 5214-3, Field Operations Division at Sandia Corporation's Salton Sea Test Base.

Gordon began his employment at Sandia in April 1955 as a

staff member of Electronic Services Division 5243 doing electronics work in conjunction with operation and maintenance of data reduction facilities. He transferred to Salton Sea in January 1956.

From 1950-54 Gordon worked as an assistant physicist at New Mexico A & M where he studied toward a Master's degree.

Gordon studied Engineering at the University of New Mexico and obtained a BS in Physics from Eastern New Mexico University. He is a Navy veteran.

SAMUEL A. MOORE to manager of Engineering Department 1210.

During his seven and onehalf years at Sandia "Sam" has been in the 1200 organiza_ tion. In July 1951 he was appointed supervisor of Section 1283-1 and a

year later be became a division supervisor.

Previously he was five years with the Wright Aeronautics Corporation in Paterson, N. J., in turbo jet testing and design.

Sam served four years in the Army mainly in aircraft engine development work at Wright Field in Ohio.

He holds a Bachelor's degree in Mechanical Engineering from the University of Rhode Island and is a registered professional engineer in New Mexico.

JOHN F. RUSSELL to supervisor of Component Evaluation Section A, 5523-1, Quality Engineering Department.



During his five years at Sandia John has worked in the same departmentin evaluation, quality assurance inspection procedures and instructions.

Previously he was two and onehalf years with the AC Spark Plug division of General Motors in Milwaukee.

John graduated from the University of Wisconsin in 1949 with a Bachelor's degree in Electrical Engineering.

While in the Navy for three years he attended Radio Material School at the Navy Research Labs

LEE F. DENTON to supervisor of Technical Section 7312-2, Operations Division A II.

> He has been with Sandia Corporation since May 1952, first in Albuquerque in what is now Division 7319. Lee holds a

BS and MS in Physics from Oklahoma State University and also studied at Eastern Oklahoma A&M.

He served in the Army for two different periods from 1941-46 and from 1950-52.

Previous work experience includes two years as a telegrapher apprentice for the Santa Fe Railroad and several years with a lumber company in Oklahoma.

LEONARD G. PARSONS to supervisor of Technical Section 7316-2. Opera-

K. B. U. VI, Surveillance. Leonard has participated in surveillance and operations activities since he began work for Sandia Corporation in June, 1953.

tions Division A

Before coming to Sandia he was an engineer for radio stations KABC and KMAC in San Antonio, Tex., a field engineer for Philco Corporation in Pennsylvania, and a teacher at Southwest Texas State College and at Austin, Tex., public schools.

Leonard received a BA and MA in Education from Southwest Texas State College and also studied Electrical Engineering for two years at San Antonio College. He served in the U.S. Marine Corps from 1943-1945.

JOHN H. BANKER to supervisor

Salton Sea during his five and

He came to Sandia from the

Instructor in an Army Photographic School of Aerial Photography and Map Making located in the

stationed in the China-Burma-India theater as a camera repairman and aerial photographer.

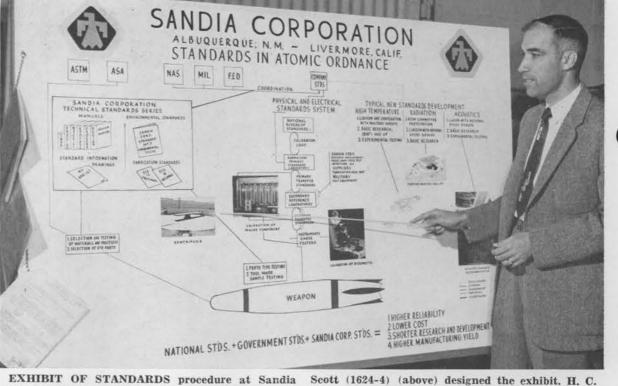


EXHIBIT OF STANDARDS procedure at Sandia Corporation is on display this week at the American Standards Conference in San Francisco. C. A.

AIIE Members to Hear of Imagineering

"Imagineering Plus Engineering Equals Miracles" will be the title of a talk presented to the Albuquerque Area Chapter of the American Institute of Industrial Engineers Monday, Nov. 18. Speaker will be Louie E. Throgmorton, vice president and director of public services for Republic National Life Insurance Company, Dallas, Texas.

The meeting will begin at 7:30 p.m. at Reddy's Rendezvous, at Fifth and Silver downtown, according to Al Kaping (2514), president.

Promotions

(Oct. 25-Nov. 7)

Robert K. Crawford (2132) to Inspector (Me-chanical) Joe Natt Skelton (2414) to Welder (Pipefitter) William D. Feldman (4135) to Tab. Analyst Vlasta E. Hruska (7225-3) to Secretary Wanda Stevenson (2133) to Coil Maker Barbara Carey (2221) to Typist Clerk Aaron J. Kint (2132) to Inspector Felix Padilla (2721) to Inspector R. Geraldine Summers (2461) to Document Clerk June J. Stone (2461) to Document Clerk

R. Geraldine Summers (2461) to Document Clerk June J. Stone (2461) to Document Clerk Zilah V. Wilson (2461) to Document Clerk Merlene E. Medina (2533) to Stenographer Clerk John T. Stanfill, Jr. (2462) to Pressman (Offset) Mary L. Atencio (2461) to Document Clerk Evelyn J. Hughey (4153) to Accounting Clerk Edward N. Villella (7232) to Utility Operator Charles W. Ray (7232) to Utility Operator Joe F. Salazar, Jr. (2112) to Service Clerk (Fabrication) Thomas K. Smith (7232) to Utility Operator Uly A. Katzenstein (4130) to Secretary George Dennis, Jr. (7232) to Utility Operator Dean H. Cranston (7411) to Drafisman Richard E. West (1454) to Staff Member Richard E. Demo (7412) to Staff Assistant Uean H. Cranston (7411) to Draftsman Richard E. West (1454) to Staff Member Richard E. Demo (7412) to Staff Assistant (Senior Draftsman) Mary S. Williams (3124) to Staff Assoc. Adm. Evelyn L. Hughes (7225) to Typist Clerk William Schuessler (2132) to Inspector (Mechanical)

(Mechanical) Barbara L. Barney (2461) to Librarian Alan A. Netz (5241) to Data Reduction Clerk Patricia A. McNamara (7225) to Service Clerk (Test Data) Carol Ann Russell (7221) to File Clerk Beulah E. Hansen (4135) to Senior Clerk (Keypunch) Shirley Ann Simon (2553) to Teletypewriter Operator

Operator stine Bassett (7225) to Secretarial Stenographer

Stenographer ovd A. Kelton (2473) to Heavy Equipment Operator

Special Course in Tolerance of Position, Form Given Employees

Roy Dell (7412)

-instructs drafting course for 1,000 employees-

Biggs, manager of the Physical and Electrical Stan-

dards Department (1650), spoke at the conference.

Sandia Corporation has published its own specification governing the tolerances of position and form used on its engineering drawings. Responsibility for writing the document was assigned to Sandia's Drafting Division, 7412.

The publication, SC-7016 (SP). adopted here in September, 1055, was written to meet Sandia's needs after a thorough study of similar works by the American Standards Association. Society of Automotive Engineers, Military Standards Association. and the British Standards Institution.

Roy Doll. a representative of the drafting organization has conducted the explanation of the specification to groups of Sandia employees. In this, the second

Soutnik to Receive Attention of IRE At Next Meeting

"Care and Feeding of the Russian Satellite" will be the discussion topic at a meeting of the Albuquerque-Los Alamos Section of the Institute of Radio Engineers Thursday, Nov. 21.

series of discussions, some 1,000 Corporation engineers, draftsmen, and technicians have received the explanation which is desirable for a more precise understanding of the application of the publication.

According to Mr. Dell, "There can be no question on the location or form of features shown on our drawings if the specification is understood by the user. The meetings are informal with open discussion and last about two and one-half hours. Experience with the individual questions of those attending has been of considerable help in the general understanding of the groups."

The discussion groups, coordinated by General Training and Education Division, 3124, began last January.

Mr. Dell has been employed at Sandia for three years as an engineering drawing checker directly involved with the applications of "Tolerances of Position and Form, Including Maximum Material Conditions," the title of the drafting specifications publication.



dia Corporation's Salton Sea Test Base. John has been with organiza-

tion 5214 at

poration.

Art Center School in Los Angeles raphy.

Prior to this he served as Chief

During World War II he was

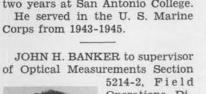
Robert K. Crawford (2132) to Inspector (Me-

Operations Division at San-

one-half years with Sandia Cor-

where he studied advanced photographic techniques and all branches of commercial photog-

Philippines.



in Washington, D. C.

He is a member of the American Institute of Electrical Engineers and is a registered professional engineer in New Mexico.

RUDOLPH W. WIDMAN to supervisor of Drafting Section A IV, 7411-4

"Rudy" came to Sandia Corporation in June after nearly 25 years with Bell Telephone Laboratories.

At BTL he was a supervisor in Military Electronics

After attending high school in Newark, N. J., Rudy joined Western Electric as a student draftsman. He was at Kearny, N. J., for four and one half years, then transferred to BTL. While with the Bell System he has been stationed in New York City, Whippany, Chicago, Jersey City and Burlington, N. C.

In recent years John has taught a night school course in Amateur Telescope Making.

O. B. TJELTWEED to supervisor of Section 1246-1, Project Division.



Bachelor's degree in Electrical Engineering from Montana State College in 1953.

Previously he served five years in the Army Air Force as a navigator.

He is a professional registered engineer in New Mexico and a member of Tau Beta Phi, engineering honorary, and Phi Kappa Phi. scholastic honorary.

Llovd A. Kelton (2473) to Heavy Equipment Operator Francis S. Shea (2414) to Pipefitter Robert E. McDermott (2722) to Inspector (Special Components) Alice M. Graves (2462) to Reproduction Equipment Oberator (Mult.) Richard L. Terwilliger (7316) to Technical Assistant (Surv.) Theodore F. Roller (7411) to Draftsman Sylvia Sue Graham (7221) to Senior Clerk (Files & Records) John A. Caldwell (2462) to Ozalid Operator N. Lorene McEven (3154) to Personnel Clerk Gladys M. Boren (2461) to Senior Clerk (Documents)

(Documents) Felix C. Almaraz (5512) to Service Clerk Fidencio C. Sandoval (4135) to Tab. Equipment

Fidencio C, Sandoval (4135) to Tab. Equipme Operator Boney Vigil (4135) to Tab. Eqpt. Operator Frank A. Toya (2461) to Document Clerk Frances V. Richards (7225) to Typist Clerk Judith L. Thompson (7225) to Typist Clerk Carol R. Goats (7225) to Typist Clerk Maxine Drymon (7225) to Typist Clerk Beatriz (Betty) Gurule (7225) to Typist Clerk Marv Barela (7225) to Typist Clerk Cynthia D. Mabery (7225) to Typist Clerk Eulita C. North (2231) to Wireman (Electronic Ass'y.)

Cynthia D. Maberv (7225) to Typist Clerk Eulita C. North (2231) to Wireman (Electronic Ass'y.) Thomas O. Taylor (7314) to Staff Assistant Carlos R. Shelton (142) to Staff Assistant **Supervisory Lateral Transfers** Josenb S. Miller from Supervisor of Section 4135-1 to 413-1 Haddon C. Redding from Supervisor of Sec-tion 4113-1 to 4152-2 Don M. Lucas from Supervisor of Section 2325-1 to 2361-1 Jesse D. Wright Jr., from Supervisor of Section 5523-1 to 5522-4 James H. Scott from Supervisor of Division 5231 to 5255 Arthur W. Porter from Supervisor of Section 2112-2 to 2111-1 Carter E. Howard from Supervisor of Section 4135-3 to 4142-1 William J. Denison from Supervisor of Divi-sion 1216 to 1224 David Essad from Supervisor of Section 1215-2 to 1423-1 Benton W. Jolliffe from Supervisor of Section 2540-2

ro 1423-1 enton W. Jolliffe from Supervisor of Section 2541-2 to 2542-2 Bent

Dr. B. L. Basore, Dikewood Corporation, will moderate a panel of experts on astronomy, physics, radio and electronics. The discussion will center around various phases relating to satellite orbits, space problems, power sources, radio characteristics, radio propagation, radio measurement teachniques and other problems associated with space vehicles.

Several enthusiastic "Sputnik fans" in the Albuquerque-Los Alamos area have been using radio tracking techniques to gather scientific data and these will be discussed during the meeting.

"It is expected that this will be one of the most interesting programs of the year," publicity chairman Bob Spence (5222) says. "The public is invited."

The meeting will be held in Rm. 201 of the Electrical Engineering Building, University of New Mexico, beginning at 8 p.m .

New Organization At Livermore Branch For Service Groups

In a move to separate service organizations from technical groups a second superintendency has been created at Livermore Branch of Sandia Corporation.

R. E. Poole, Vice President at Livermore, is acting head of the new organization 8200, and two existing departments have been placed in the superintendency.

Administrative Services Department I, formerly 8130, headed by E. W. Baldwin, now is Administrative Services Department 8210. Administrative Services Department II, formerly 8140, headed by J. L. Rowe, now is Plant Services and Security Department 8220.

Reporting to the Director of Systems Development, W. J. Howard (8100), are C. R. Barncord (8110), L. E. Hollingsworth (8120) and W. C. Scrivner (8130), who recently transferred to Livermore.



FAST ACTION on the flag football field aroused (5142), Ray Harlan (1612), Bill Little (1652) and Vern Kemp (1613). Team 5100 won the game cheers from this group of players warming the over 1600 19-6. Rain and hail were added hazards. bench. L to R are Milt Kane (5141), Rod Leach



TROPHIES AWARDED-Art McMullen, captain of the softball championship 1400 team, presents the Corporation trophy to L. A. Hopkins, Jr., Director of Component Development, 1400.

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Belen.

Corporation Flag Football Team to **Take on Soldiers**

Arrangements are being made for a flag football game between the "all star" players of Sandia Corporation and Sandia Base military.

The gridiron tilt is set for the evening of Tuesday, Nov. 26, at the Base football field near the corner of Gibson and Pennsylvania. Starting time is 8 p.m.

John Foster (7122), president of the Sandia Employees Flag Football League, is serving as coordinator of arrangements. Howard Smyth Jr. (2551) has been named Sandia head coach, and Hal Cushman (2551) and Bill Caudle (5144) are assistant coaches.

Squad members will be:

Foy Graves (2461), Archie Smart (AEC), Tony Garcia (2154), Jerry Cole (2153), Ron Zottnick (2511), George Chandler (2514), Sam Hong (5141), Charlie Salazar (2461), Buddy Sanchez (2461), Bill Gamerale (7231), Pat Moore (1471).

Dick Peterson (2461), Bob Loncharich (5142), Julian Lovato (7412), Clyde Hughes (7412), Ron Bump (5523), George Hilderbrandt (2552), Larry Tichenor (2461), Dan Power (5241) and Bob Hedges (1624)



Leading the Sandia Employees

Flag Football Association is 5100

with a record of 3 won and 1 lost.

Bad weather has postponed several

scheduled games and league play

Team 2500 is the only undefeat-

ed team in the league with two

wins to its credit but is holding

third place behind 1400 which has

two wins, a tie and one loss.

will continue through next week.

FURNACE GUARDS, 2, floor; used Compact vacuum cleaner, \$65. Silva, CH 3-0191, 1720 Wilmoore Dr. SE.
 FUR COAT, Mouton, size 10. Montgomery, AX 9-5996 after 6.

CRAFTSMAN TUNER, Steven Hi-fi, \$75. Need foreign car, will rework. Carlson, AX 9-7111.

'56 FORD radio, complete, \$30. Under-wood, AL 6-7709.

MOUNTAIN HOMESITE, 5 acres, panorama view, located in Sandias, 8½ miles from city limits, 15 minutes from Base, \$3950 w/terms. Dixon, AL 5-5312.

LOST AND FOUND

LOST—Brown rubber football, gold shell earring, clear plastic scarf, black and silver button type earring, fan shape ear-ring w/green and rhinestones, safety glasses w/grey rims, sunglasses in brown case, copper doll earring, copper and blue earring, tan leather gloves, detach-oble dark lens in glass case, Galles-Groes-beeck coin holder w/keys, red plaid jacket, man's light brown plastic frame glasses, diamond shape gold earring, keys w/dog tag, plastic raincoat. LOST AND FOUND, Ext. 26149.

5100 Leads Football League

SPORTSMANSHIP AWARD of the Sandia Employees Softball Association was voted to the 2400 team. Here, R. E. Hopper, Superintendent of Plant Services, makes the trophy presentation to

Tony Lopez and Foy Graves, co-managers of the softball team.

HEMMED IN-Sam Hong, right, is doing some fancy running to

evade M. O. Jones, center, and Jim Tichenor, left. The flag foot-

ball game was played last week with 5100 defeating 1600.

Feam

5100

400

2500 2100

1600

400

7200

p.m.

¹53 OLDS 98 hardtop, power windows, brakes and seats. Sparber, AL 5-3849. MODEL TRAINS, HO and O gauge, switches, track and accessories. Laskar, AX 9-1024. SAVAGE MODEL 340, 30-30 bolt action, Weaver K3 scope, extra ammo, hunted once. Sutton, AX 9-4972 after 6.

ROLLER SKATES

SHOPPING CENTER

League standings are as follows:

Games are played on a field lo-

cated on Softball Diamond B.

Starting times are 6:30 and 8:00

Won

Lost

Tied Points

321/2

1/2

CLASSIFIED ADVERTISING

SHOPPING CENTER

Deadline: Friday noon prior to week of publication unless changed by holiday. RULES

- 1. Limit: 20 words
- One ad per issue per person Must be submitted in writing Use home telephone numbers For Sandia Corporation and 4.

AEC employees only 6. No commercial ads, please 7. Include name and organization.

BASSINET AND PAD; playpen and pad; baby scales. Parks, AM 8-0875. TURKEY HENS, fresh, 13 lbs. or over, 60c per lb., toms, 20 lbs. or over, 55c per pound. Petrillo, Calle Rancho Verde in Balan

0

TRANSMITTER, 300 watt, in 47" Bud cab-inet, TVI suppressed. Bierly, AL 6-7780. ELECTRIC GUITAR, Howaiian, white pearl finish w/case, amplifier w/white leather-ette covering, make nice gift, \$135. Deng-ler, AX 9-1745.

SHOPPING CENTER

52 TRUCK, Dodge panel, 1/2 ton, conven-tional and fluid drive, new motor, new tires, R&H ,low mileage, \$550. Perkins, tires, R&H AL 6-2664.

AL 0-2004. BOSLEY CAMERA w/flash attachment, filters and light meter, \$50; power lawnmower, \$20. Jolley, DI 4-0724, 3002 Sierra Dr. NE.

NEXT DEADLINE FOR SHOPPING CENTER ADS Thursday, Nov. 21

SHOPPING CENTER

BED-DAVENPORT, brown tweed, maple, Ethan Allan; matching chair, step tables, coffee table, 2 brass lamps, six months old, \$250. Durkee, Ext 45188 after 5.

TROMBONE, Martin, used 6 months, \$65 w/terms. Weber, AL 5-6811, 3117 Madeira NE. GAS RANGE, 11/2 years old, \$35. Baum-garten, Ext. 20141, 2704 Los Tomases NW.

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PROFESSIONAL CLARINET, \$45. Browning, 2130 Erbbe NE.

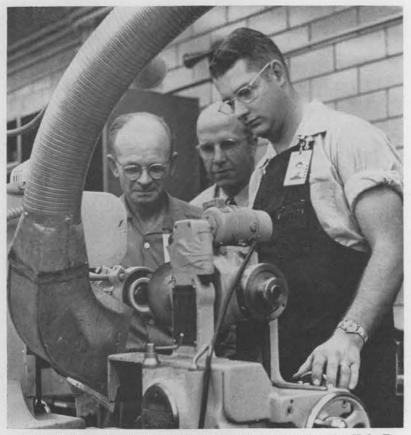
airl's white size 3

Constructions in the second se	BABY CARRIAGE, Storkline, reversible	NW.	RULLER SKATES, girl's, white, size 3. Dun-	EXT. 20149.
FOR SALE	folding handle, folding top, \$20. Hogue,	UPRIGHT FREEZER, Maytag, 12 cu. ft., 5 years old. Rainwater, AX 9-3286 after 5.	lap, AL 6-1040. '50 HOUSE TRAILER, 33', one bedroom	FOUND—Key to GM w/bear emblem and Maisel's on ring, brass key, browr
35mm CAMERA, Praktica FX Primo-Plan F 1.9 lens, w/case, instructions, Pola	AX 9-1807, 1435 Espejo St. NE. 20" BICYCLE, girl's, balloon tires, punc- ture proof, \$15; roll-a-way bed, 46",	GAS RANGE, Dixie, full size, \$50. New- man, CH 2-0944, 2318 Central SW,	Spartan Royal Mansion. Morrison, Ext. 37137, Lot 10, Meiers Trailer Court.	leather and gold cuff link, gold loop ear- ring. LOST AND FOUND, Ext. 26149.
screen, haze filters, Kopil self-timer, \$75. Nogle, AX 9-3863 after 5, 11721 Clifford	w/mattress, \$15; ladies' Schick, used twice, \$8. Mancuso, AX 9-5252.	Moon Courts. CRIB, Deluxe Kroll w/mattress, \$25; high	26" BICYCLES, 1 boy's and 3 girl's, Schwinns, \$20 each. Allen, AX 9-4909.	MISCELLANEOUS
NE. PROJETOR, 35mm slide, 4" E.F., f 3.5, anastigmat, coated, blower cooled, 200	21" TV, console, early American maple cobinet, less than a year old, picture tube warranty still in effect, \$140. Stamm,	chair, \$5; deluxe Thayer buggy, \$20; full size gas range, \$40. Williams, AL 5-3160.	REFRIGERATOR, 10' Kelvinator, Sanders, CH 3-0561 after 5:30 p.m. SKIS w/safety binding; 91/2 M ski boots;	AT STUD, Chihuahua (small) Reg. AKC Champion stock. Arthur, DI 4-3354 2808-10th NW, after 5.
watt. Miller, Ext. 5-2194. GALVANIZED PIPE, 1/2", 252', 14c/ft.	DI 4-4325. 65x135 LOT, corner of Franciscan & Reese,	'48 STUDEBAKER, Land Cruiser, R&H, over- drive, \$165 or best offer; punch bowl	size 16 maroon ski pants; set of golf clubs w/almost new bag. Hillenbrand, AL	WANTED
Lewis, CH 2-4604.	Swanson addition, 1 block off Edith St.,	set w/eleven cups, \$15. Davis, DI 4-1530,	4-4715.	HOME FOR KITTEN. Very pretty small
CAMPER, fits 1/2 ton pick up, insulated walk-in type. Davis, AL 5-4812 after 6.	\$950. Leyba, DI 4-0778. HICKORY SKIS, 6'x8'', laminated, w/safety	608 Delamar NW. FUR STOLE, silver blue let-out muskrat,	MAYTAG WASHER, wringer type, \$25. Beeson, AL 5-3249.	grey kitten, male, to a good home only. Tatum, CH 2-9021.
BABY "BOBBER," new, \$6. Anderson, CH 3-5310. AUTOMATIC WASHER, used; '54 GM	binding, poles, new, never used, \$45. McKinley, Ext. 34133.	appraised at and insured for \$350; will sell for \$85. Metzger, Ext. 25298 after duty hours.	WASHING MACHINE, wringer type, GE, w/hose and pump, \$35, Hill, AL 6-1931.	TO SHARE APARTMENT. Lady wanted to share two bedroom apartment. Irene Mesecher, AL 5-0131, 343 Jefferson NE.
Frigidaire, w/hoses, \$75. Buchly, AX 9-5806.	VERTICAL BLINDS, one 4'x4', one 5'x4', bargain; metal trunk, 3'x4'. Montoya, AL 6-5434, 1000 San Pedro SE.	SECTIONAL SOFAS, modern, two-piece, grey, almost new, foam cushioned, re-	3402-C Smith SE. YOUTH BED, Storkline, light oak; baby bathinette, James portable dishwasher.	Call Sunday afternoon. WOMEN BOWLERS, 2, for established Wed-
CHROME TABLE, large, w/8 chairs, extra leaves, ideal for large family, \$75 or	BEDROOM SUITE, 5 piece—double bed, dresser, chest, springs and innerspring	versible, \$150. Pickel, AX 9-1291 after duty hours.	Ballard, AX 9-4530.	nesday night leadue, entry fees paid. Upchurch, AL 6-5340.
best offer. Eaves, AL 6-4203 after 5. 26" BICYCLE, girl's, \$15. Parker, AX	mattress, \$50. Saavedra, AL 6-2997, 1829 Indiana NE.	CAMPING TRAILER, '53, 14' Crown. Young, AL 5-8193, 837 Valencia SE.	PLAY PEN, \$6; car bed, \$3; fibre glass bow and arrow set, \$6; Kenmore elec- tric sewing machine. \$70, limed-oak cab-	CHILD CARE in my home, all ages, day- time, reasonable, near Lobo Joe's. Na- toli, AL 5-2336.
9-1485, 2203 Hendola Dr. NE. CHIHUAHUA, 2 year old female, purebred, \$20. Parker, AX 9-3483.	CUSTOM MADE CASES for photographic equipment, musical instruments, guns, etc. Morison, AX 9-5698.	TINDER LIGHTER, \$18; Winchester 1873 rifle, \$30; trade for pistol or revolver. Smitha, AX 9-1096, 8607 Menaul.	inet. Mason, AX 9-2836. ADDING MACHINE, Monroe, 10-key, credit	WOULD LIKE to contact person who has 35mm slides of Shrine parade in Albu-
WATER COOLED ENGINE, 12 hp, 2 cylin-	STEEL GUITAR, electric, Rickenbacher, w/case, amplifier, 8" speaker, pedal	35mm CAMERA, Ciro, rangefinder, Graflex 50mm adjustable f/3.5 lens, film, flash	balance, \$325. Brannon, AL 5-0261. MAGIC CHIEF RANGE ,\$35. Cox, AX 9-	querque. Flanagan, AX 9-4268 after 5:30, 9014 Matthew NE.
der, sell or trade. Need 2-wheel trailer, white face calf or woodwork tools. Carl- son, DI 4-8080.	control, \$120. Smith, AX 9-1264. TWO PAIRS DRAPES, extra wide, 93" long,	attachment, Mz adapter, flash bulbs, leather case, \$37. Freshman, AL 6-7853.	5855. TWIN BED, extra long, inner spring mat-	HOME FREEZER, used ,chest type, approx. 15 cu, ft, Baker, Ext, 47241.
TOOL BOX and precision tools, new, Ken- nedy, reasonable. Martin, AL 5-1542	grey background; walnut bookcase, glass door; mahogany two-shelf record cabinet.	SOFA BED, rose frieze, matching club chair, both \$60; grey carpet, all wool,	tresses box springs, on frame w/drawers underneath and bookcase head, \$40. Gow-	TO TRADE. Have '50 Plymouth tudor, will trade for freezer. Grace, AL 5-4009.
after 5:30, 5016 Roma NE. HIGHWAY FRONTAGE, 840 feet, on 66	Henry, AL 6-2467. MAPLE COUCH, tweed covering, Francis-	size 9x12, \$30. Fagan, CH 7-9285. ADJUSTABLE CRIB, full-size, w/mattress,	dey, CH 3-9270. '49 FORD, 6 cylinder, good second car,	 BR. HOUSE or apartment, unfurnished, near Base. Huddleston, Ext. 29265.
east, 9 miles out, small house, good well w/pump. Further information call Fletcher, Ext. 23144.	can, nearly new, \$65. Chapin, AM 8-0718. LOUNGE CHAIR, Barca, dark green up-	\$17.50; small crib can be made into play pen. \$17.50; baby scales, \$2. Eagan, AL 5-6820.	\$165 cash. Kochmann, AX 9-5133. COIL PRODUCING 41/2 inch spark, de- vice for climbing arc included, best	SIDEWALK BICYCLE, boy's, in good condi- tion w/training wheels, price must be reasonable. England, AX 9-4716.
'57 RAMBLER, 4-door, 7000 miles, two- tone, green and white, sleep and re-	holstered, \$15. Gauerke, AX 9-4746, 1208 Elizabeth NE.	16" TV, GE console, chassis and picture tube are operational, mahogany cabinet,	offer or trade for amateur radio equip- ment. Stanfill, AL 6-2809.	FOR RENT
clining seats, reasonable. Kilmartin, AX 9-1241.	2 BR. HOME, large living room, 10 min- utes from Sandia, \$900 down, \$78 per	\$25. Finley, AM 8-1157. ACCORDIAN, Hohner, treble tone, 120	WINCHESTER, Model 52C, heavy barrel target rifle, target sights, \$100. Snod-	3 BR. HOUSE, 13/4 baths, adults only, 5 minutes from either Base. Torres, AL
STRING BASS, \$65. Ezell, AL 6-4220.	month. Mares, AX 9-2497.	bass w/case. Jorgensen, AL 6-1110.	grass, AL 6-4072.	6-6111.

Sandia's Training Program Opens Door to Knowledge



ELECTRONICS III students receive instruction in a special training laboratory under the direction of Arthur F. Lawrence, 1614.



TRAINING in Special Machine Section is being taken by Kyle B. Williams, right. Left is R. E. Herbert, 2151-2 supervisor, and in the rear Ken Dickerson, General Training and Education Division.



George Harris is a Sandia employee who's going places. The name, George Harris, is fictitious, true, but this hypothetical person is symbolic of several hundred employees in the Corporation who are making their futures brighter by taking advantage of the benefits of a general training program.

Sandia's rapidly expanding onthe-job training, augmented by out-of-hours class work, is a happy thing for both the hundreds of Georges and the Company.

Let's look at George's case first. He joined Sandia Corporation as an Electronics Technician trainee. George has a keen eye to the future and with the opportunities available to him chances are he will not remain in his present job too long. It depends on George. his ambitions, his initiative, his will to learn and the opportunities that the work of the Corporation provides.

As his know-how increases so does his worth to Sandia. And as higher skills are needed by the Corporation so will his grade and paycheck advance. So George's industry probably will bear fruit.

Does Sandia Profit?

How does Sandia make out in this enterprise? Teachers have to be provided, classrooms maintained, equipment made available. It takes a lot of money.

There is a continuing scarcity of men and women with the skills needed by Sandia Corporation. The best way to get highly qualified technicians is to "grow our own." So from within the Corporation's ranks and when necessary from new hires are recruited men and women with potentials and ambitions. They will provide Sandia Corporation and Uncle Sam with the skills that are needed.

It is Sandia's policy to provide training to make possible and easier the step to a better job. It is a happy solution for both employee and employer.

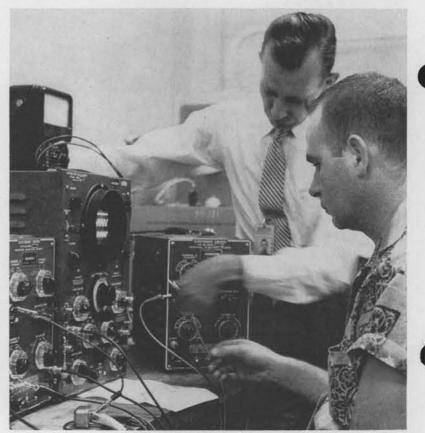
However, this pleasant chain of circumstances does not occur unless planned. That's why the ever broadening general training program at Sandia is carefully devised and energetically administered.

Sandia has training programs designed to provide electrical inspectors, mechanical inspectors, machinists, technicians in electronic assembly, and welders

Training Successful

Already Sandia training programs have provided draftsmen. Other special training has produced skilled key punch operators, pressmen for the printing plant, security inspectors, heavy equipment operators and maintenance specialists, to name a few.

In this development of on-thejob training it became evident that it was necessary to teach the teachers. A class known as "Onthe-Job Training Methods" has taught more than a hundred teachers how to do their jobs bet-



RECEIVING INSPECTION Division instruction is received by Rocco Natoli (right) from Norman Zirwas, staff assistant, 2711.



MECHANICAL INSPECTION Division provides on-the-job training for Bert Luhn (center). Left is John Ballentine, 2722-1 supervisor, and right, Chester Laskowski, layout operator, acting as instructor.



ELECTRONICS TECHNICIAN training is received by Carl Canerva (center) in the Branch Shops Section (2131-1) of the Electronics Standards Department. Left is Andrew J. Fuller, General Training and Education Div., and right, J. K. McDowell, section supervisor.

ter.

General training at Sandia has taken hundreds of employees into many varied fields. Special mathematics classses for draftsmen have been offered. Office procedure classes have been given for secretaries. A d e m o n s t r a tion course on corrosion has been given to inspectors in 2710 and electronic training has been provided personnel at remote sites.

Future Looks Good

So it can be seen that George Harris, our hypothetical trainee, has quite a future. He benefits from on-the-job instruction. After-work classes further his education. Facilities for his training are the best. The classes he takes have a high academic standing. They are designed for specific work areas in which he wishes to advance.

Sandia's general training program is affording more employees opportunity to prepare for positions of higher responsibility and pay and at the same time helping Sandia maintain a highly skilled work force,

ADVANCED Secretarial and Clerical Efficiency course is presented in classrooms of the General Training and Education Division. Jean Gillette, foreground, lectures to class members.